CIVIL QUALITY CONSULTANTS & ENGINEERS

(Buildings Geo-Tech & Highway Materials Testing Laboratory)
An ISO 9001: 2008 Certified Company

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Job No: CQCE/BBMP/KDC/W.No.17/2017-18 — 12.10.2017

Aggregate Gradation Test

IS : 2386 Part I

Client	**Executive Engineer,** Rajarajeshwari Nagar Division, BBMP, Bangalore.
Agency	**Sri. K.Damodar & Co,** Contractor, Bangalore.
Name of the Work	Remodeling of Segregation Point, RCC Drain and Development of water body at JP Park (Muthyalanagara) in Ward No.17, BBMP, Bangalore.
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	12.10.2017

Total Weight of Sample: **5500** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	415	7.5	7.55	92.45	90-100	
4.75	2984	54.3	61.80	38.20	35-51	
2.36	655	11.9	73.71	26.29	24-39	
1.18	480	8.7	82.44	17.56	15-30	
0.3	326	5.9	88.36	11.64	9-19	
0.075	284	5.2	93.53	6.47	3-8	

Total Weight of Sample: **5450** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	385	7.1	7.06	92.94	90-100	
4.75	2515	46.1	53.21	46.79	35-51	
2.36	825	15.1	68.35	31.65	24-39	
1.18	470	8.6	76.97	23.03	15-30	
0.3	362	6.6	83.61	16.39	9-19	
0.075	545	10.0	93.61	6.39	3-8	

Note:

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For CIVIL QUALITY CONSULTANTS & ENGINEERS

Authorised Signatory

Office & Laboratory : # 133, Bhuvaneshwarinagar, Dodda Basti Main Road, Bangalore - 560 056.
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Ref No: CQCE/BBMP/KDC/W.No.17/2017-18 Date: 12.10.2017

Aggregate Impact Value

IS: 2386 Part IV

Client	**Executive Engineer,** Rajarajeshwari Nagar Division, BBMP, Bangalore.
Agency	**Sri. K.Damodar & Co,** Contractor, Bangalore.
Name of the Work	Remodeling of Segregation Point, RCC Drain and Development of water body at JP Park (Muthyalanagara) in Ward No.17, BBMP, Bangalore.
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	12.10.2017

Sl No.	Details	Trial No. 1	Trial No. 2	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	382	384	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	89	91	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	293	293	293	
4	Aggregate Impact value = percent fines $100^* (W_2/W_1)\%$	22.89	23.30	23.70	23.30

Comments:

- Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%
- Information is furnished by the Agency
- Note

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Lab Ref No: CQCE/BBMP/KDC/W.No.17/2017-18 Date: 12.10.2017

Aggregate Impact Value

IS: 2386 Part IV

Client	**Executive Engineer,** Rajarajeshwari Nagar Division, BBMP, Bangalore.
Agency	**Sri. K.Damodar & Co,** Contractor, Bangalore.
Name of the Work	Remodeling of Segregation Point, RCC Drain and Development of water body at JP Park (Muthyalanagara) in Ward No.17, BBMP, Bangalore.
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	12.10.2017

Sl No.	Details	Trial No. 1	Trial No. 2	Trial No. 3	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	382	384	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	87	89	91	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	293	293	293	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	22.89	23.30	23.70	23.30

Comments:

Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

Information is furnished by the Agency

Note:

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Job No.: CQCE/BBMP/KDC/W.No.17/2017-18 Date: 12.10.2017

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Executive Engineer,** Rajarajeshwari Nagar Division, BBMP, Bangalore.
Agency	**Sri. K.Damodar & Co,** Contractor, Bangalore.
Name of Work	Remodeling of Segregation Point, RCC Drain and Development of water body at JP Park (Muthyalanagara) in Ward No.17, BBMP, Bangalore.
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	12.10.2017

Result : Flakiness Index = **10.85%**

Elongation Index = **13.92%**

Result : Combined Flakiness & Elongation index **24.77%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Lab No.: CQCE/BBMP/KDC/W.No.17/2017-18

12.10.2017

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Executive Engineer,** Rajarajeshwari Nagar Division, BBMP, Bangalore.
Agency	**Sri. K.Damodar & Co,** Contractor, Bangalore.
Name of the Work	Remodeling of Segregation Point, RCC Drain and Development of water body at JP Park (Muthyalanagara) in Ward No.17, BBMP, Bangalore.
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	12.10.2017

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2021	2023	2025	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1266	1268	1270	
4	Weight of saturated surface dry aggregate in air	W_3 g	2016	2018	2020	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	750	750	750	
6	Weight of oven dried aggregate	W_4 g	2008	2009	2010	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.677	2.679	2.680	2.679
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.706	2.711	2.716	2.711
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.40%	0.45%	0.50%	0.45%

Comments:

1. Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%
2. Information is furnished by the Agency

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Job No.: CQCE/BBMP/KDC/W.No.17/2017-18

Date: 13.10.2017

TEST REPORT ON STABILITY OF MIX

Client	:	**Executive Engineer,** Rajarajeshwari Nagar Division, BBMP, Bangalore.
Agency	:	**Sri. K.Damodar & Co,** Contractor, Bangalore.
Name of the work	:	Remodeling of Segregation Point, RCC Drain and Development of water body at JP Park (Muthyalanagara) in Ward No.17, BBMP, Bangalore.
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Semi Dense Bituminous Concrete
Date of Testing	:	13.10.2017

The results of the tests conducted on the bituminous mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, at 60° C,Kn	9.57	10.24	8.2 Kn (min)
2	Marshal flow at 60° C, mm	3.68	2.45	2 – 4
3	Percent air voids	3.25	4.36	3 – 5
4	Percent voids in mineral aggregates (VMA %)	13.88	14.62	13 - 15
5	Percent voids filled with Bitumen (VFB %)	72.41	73.75	65 – 78
6	Density, g/cc	2.26	2.27	

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13.10.2017

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX
AASHTO T 164 & AASHTO T 30

CLIENT	Executive Engineer, Rajarajeshwari Nagar Division, BBMP, Bangalore.
AGENCY	Sri. K.Damodar & Co, Contractor, Bangalore.
NAME OF THE WORK	Remodeling of Segregation Point, RCC Drain and Development of water body at JP Park (Muthyalanagara) in Ward No.17, BBMP, Bangalore.
DATE OF TESTING	13.10.2017

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474.5	475
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25.5	25.00
7. Bitumen content in %	5.10	5.00
8. Average	5.05	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	24.36	5.13	5.13	94.87	90-100
4.75	267.54	56.38	61.52	38.48	35-51
2.36	42.51	8.96	70.48	29.52	24-39
1.18	45.27	9.54	80.02	19.98	15-30
0.3	33.64	7.09	87.11	12.89	9-19
0.075	40.98	8.64	95.74	4.26	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	25.36	5.07	5.07	94.93	90-100
4.75	230.45	46.09	51.16	48.84	35-51
2.36	94.28	18.86	70.02	29.98	24-39
1.18	55.36	11.07	81.09	18.91	15-30
0.3	22.47	4.49	85.58	14.42	9-19
0.075	44.23	8.85	94.43	5.57	3-8

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